Value Maximization

Through Advanced Technologies

Comprehensive solutions for ethanol industry... globally.

New technologies for enhancing performance of existing facilities: Yield Maximization; Co-Product Generation; Product Flexibility; Water & Energy Reduction and Equipment Retrofit.

praj Ethanol Plants
One-Stop-Shop For Beverage, Industrial, Pharmaceutical & Fuel Grade Ethanol Plants...

With over 700 references in more than 70 countries, PRAJ has extensive experience of designing and installing beverage, fuel, pharma and perfumery grade alcohol plants based on variety of starch and sugar based feedstocks. With focus on offering sustainable solutions, PRAJ is continually upgrading and innovating technologies for delivering enhanced plant performance including for existing facilities - be it product maximization or co-product generation; flexibility of producing multiple products; Capacity enhancement; water & energy reduction or retrofitting equipment.

Continuing its efforts in bringing advanced technologies and innovations to the ethanol industry, PRAJ has started offering its ‘enfinity’ - Biomass to ethanol technology with integrated Smart Bio refinery™. PRAJ's Smart Bio refinery™ will process multiple agriculture residues (biomass) and shall produce multiple products like Bio ethanol, Bio CNG, Power, CO₂, Bio Fertilizer, Bio chemicals etc. The Smart Bio refinery™ will enhance the returns through the value added products.

PRAJ has developed innovative ‘Bolt-ON’ Option using the ‘enfinity’ technology which can be integrated with existing 1st Generation distillery plant / Sugar mill which will benefit with year round operations and lower CAPEX for better economic viability.
Advanced Bioprocess Technologies

Hiferm™ Fermentation Technology

- **CombiFerm™** Combines the best of Continuous & Batch Fermentation with robust yeast strain
- Efficiently processes multiple feedstock like Sugarcane/Sugar beet/Sweet Sorghum Syrup / Molasses – B/C and their combination
- High ethanol titre leading to lower water footprint and reduction in energy and effluent
- Low CIP effluent
- Delivers consistent plant performance with reduce, recycle and reuse of effluent streams
- Ease of operation
- Yeast strains suitable for production of various grades of alcohol

**HBRTF (High Brix Ready to Ferment) Technology / HTM (High Test Molasses) for ethanol**
- Use of clarified concentrated sugarcane juice with round-the-year operation for shorter sugarcane crop cycle
- Biochemical catalysis
- Lower footprint
- Hygienic design
- Shelf life of HTM more than 6 months.
Ecofine™ & EcoSmart™ Advanced Distillation & EcoMol™ Dehydration Technologies

**Ecofine™ Distillation Technologies**
for Fuel, Beverage and Industrial grade alcohol
- Scientifically designed distillation system delivering reliable performance
- Multiple design options like Atmospheric, Vacuum, Multipressure and Split Distillation
- Product flexibility: Rum Spirit, GNS, Extra Neutral Alcohol, Vodka grade spirit as well as Korean A, B or Japanese grade
- Technologies for Speciality Spirits like Scotch & Whisky, Brandy, Grape Spirit and Malt Spirit
- Technologies for solvent recovery to obtain furfural, acetone, methanol, isopropyl alcohol, butanol and ethanol

**EcoSmart™ Distillation Technologies** to produce multiple products (Industrial, Pharma & Perfumery grade alcohol)
- Energy reduction up to 30% by adopting advanced technologies like EcoSmart™-ED Evaporative Distillation or up to 90% reduction by EcoSmart™ MVR technology

**EcoMol™** Molecular Sieve Dehydration (MSDH) Plants
- Energy efficient (low & high steam pressure) EcoMol™ Molecular Sieve Dehydration system for production of ultra dry ethanol for fuel purpose
Advanced Wastewater Treatment Technologies

Technologies available to treat wastewater generated in ethanol plants using various sugar/starch based feedstocks and waste biomass.

**EcoMet XT™ Biomethanation system**
for maximization of biogas (methane) production; continuous operation for longer duration without fouling of bioreactor.

**Reduce, Recycle & Reuse Technologies**
for maximization of water recycle and reuse through thermal treatment (Ecofine™ CST-BMSW Condensate Stripping) while Membrane based (UF/RO) and biological system (MBR, SBR/ASP, MBBR) for RSW Condensate treatment.

**Zero Spent Wash Discharge (ZSD) Technologies**
- Energy integrated Raw Spent Wash (RSW) evaporation followed by either composting (Biocomp™) or incineration boiler.
- Energy integrated Biomethanated Spent Wash (BMSW) evaporation followed by either composting (Biocomp™) or drying (EcoDry™ ATFD).
Advanced Co-Product

Recovery Technologies

CO₂ Recovery Plant (EcoPure™)
- Production of Food Grade (ISBT compliant) and industrial grade CO₂
- Skid mounted units
- Low operating cost

EcoClean™
- Advanced Biogas Cleaning Technologies for removal of CO₂ & H₂S from Biogas

Biogas to Power
- Production of power using EcoClean™ and power generation using gas engine

Biogas to bioCNG
- Production of methane rich CNG for industrial application and as automotive fuel using EcoClean™

EcoDry™ DDGS
- Steam tube bundle dryer
- Energy integrated evaporation and drying technologies for producing DWG/DDGS in grain distilleries

EcoDry™ Yeast
- Double drum dryer
- Good quality protein rich dry yeast for animal feed, aqua culture or poultry purpose

Dryer-Vapour Integration
- Suitable for energy recovery from DDGS dryer and integration in ethanol facility for energy reduction
- 40 to 50% energy reduction depending on type of dryers
The key to successfully delivering over 700 projects across different geographies is our vast, multi-disciplinary, multi-locational and dedicated resources.

**Design & Engineering**
In-house core team of professional engineers from different disciplines (Chemical, Piping, Mechanical, Electrical, Instrumentation, Civil, etc.) together with other technical staff ensure that your projects are engineered in the most optimum way.

**Project Management, Construction & Commissioning**
With strong focus on project planning and scheduling and innovative execution strategies, this group works with customer from day one to ensure that the project is completed within the agreed time frame.

**Procurement & Quality Assurance**
Quality Assurance teams at Praj pursue stringent testing at various stages of procurement and production; not only in our own manufacturing plants but also at vendors’ facilities and project sites.

**Praj Matrix - R&D Center**
Backed up by Centers of Excellence and Pilot Plant facilities, Matrix - R&D Center leads Praj’s research and development efforts in fermentation, wastewater treatment and reuse, study of feedstock, process development and validation with specific focus on yields, energy consumption, water recycle, etc. Matrix is also engaged in the development of Second Generation Bio-fuels.

**Manufacturing Facilities**
Equipment manufacturing is carried out at our well-equipped manufacturing units spread over an area of 71,000 m² (covered space: 34,750 m²).

**Manufacturing Highlights**
- 16500 T/Year (Expandable)
- Maximum Dimensions: 8.5 m dia x 50 m length x 300 T weight
- Maximum thickness: 150 mm

**Global Standards & Codes**

**Health, Safety 8. Environment**
The Company has a stated HSE policy and follows it rigorously at every step, from design to commissioning.
Value Added Services
For Value Maximization

Technical Audit for Value Maximization
- Study of unit operations
- Opportunities for reduction of energy, water and effluent
- Utilization of existing assets for increasing plant capacity
- Possibility of retrofitting beverage alcohol plant to existing ethanol facility

Plant Operation & Maintenance Training
- Optimization of unit operations, enzymes, yeast and utility consumption
- Operator training for scientific operation of plant, CIP and logistics

After-Sales Service for retrofitting and equipment replacement
- Supply of equipment like degassingify column, fusel oil recovery and concentration system, methanol recovery system, dehydration plant, molsieves, heat exchangers, vapor bottles, etc.

Process Performance Enhancement & Trouble Shooting Services
- Demonstration and supply of Effytone™ range of fermentation process enhancers
- De-bottlenecking of unit operations

Analytical Services for feedstocks and products
- Analysis of feedstock, product industrial/beverage/fuel and pharma grade ethanol as per international standards like AOAC, EBC and ASTM
- Best-in-class analytical facility for feedstock and product analysis and pilot facility for 1G and 2G fermentation study.

Praj Worldwide
India | South Africa
Thailand | UAE | USA

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